PICTORIAL SCALE OF PERCEIVED WATER COMPETENCES
The building of a new tool adapted to the children

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INTRODUCTION

- INTEREST TO DEVELOP PICTORIAL INSTRUMENT FOR ASSESSING FMS PERCEIVED COMPETENCE IN YOUNG CHILDREN (1).

- PERCEIVED COMPETENCE APPEARS - AT LEAST AS IMPORTANT AS ACTUAL COMPETENCE AS IT MAY MORE DIRECTLY AFFECT MOTIVATION TOWARDS AN ACTIVE BEHAVIOR (2).

- IT IS WORTH DEVELOPING SUCH A PICTORIAL INSTRUMENT FOR ASSESSING CHILDREN'S PERCEIVED WATER COMPETENCIES.

- WITH THAT AIM, AND ACCORDING TO AN IDEA OF *KRISTINE DE MARTELAER* A COLLECTIVE OF RESEARCHERS HAVE DECIDED TO WORK ON THE DEVELOPMENT OF SUCH A NEW TOOL.

METHODS

Collective of researchers
- ✓ water competencies
- ✓ pictorial scale tools.

- TARGET POPULATION
- LIST OF WATER COMPETENCIES
- THE SCORING SYSTEM
- THE SELECTION OF AN ILLUSTRATOR
- THE CHARACTERISTICS OF THE PICTURES.

3

RESULTS : TARGET POPULATION, LIST OF WATER COMPETENCIES (WC)& SITUATIONS

⇒ TARGET POPULATION : 4 TO 8(10) YO CHILDREN

- WATER ENTRY/EXIT (WE),
- WATER ADJUSTMENT (WA),
- BUOYANCY/BREATH CONTROL (BB),
- LOCOMOTION (L),
- TURNS (T)

=> 16 SITUATIONS HAVE BEEN IDENTIFIED IN ORDER TO ASSESS WATER COMPETENCIES

4

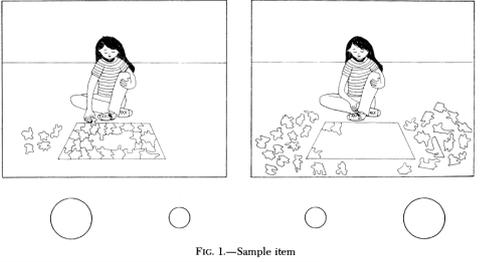# RESULTS : THE SCORING SYSTEM

Harter and Pike 1973

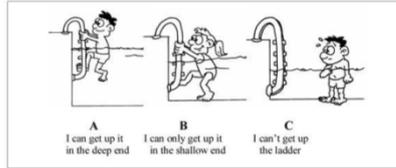(From Moreno et al, 2008)

FIG. 1.—Sample item

(From Harter & Pike, 1984)

Kan du flyde?

Ja

Jeg kan flyde med hjælp fra redskaber

Jeg kan ikke flyde

(From Stephen Junggren, Denmark)

4. Can you go up the ladder?

A
I can get up it in the deep end

B
I can only get up it in the shallow end

C
I can't get up the ladder

5. Can you float?

A
I can float on my own

B
I can float with the help of floats

C
I can't float
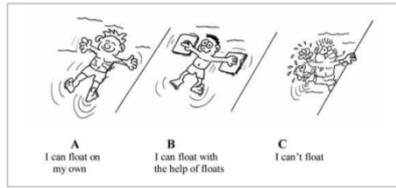
6. Can you stay in the deep end without needing any equipment to help you?

A
Yes, I can do that

B
Only sometimes

C
No, I can't do that
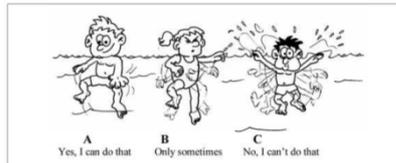
RESULTS : THE SELECTION OF AN ILLUSTRATOR
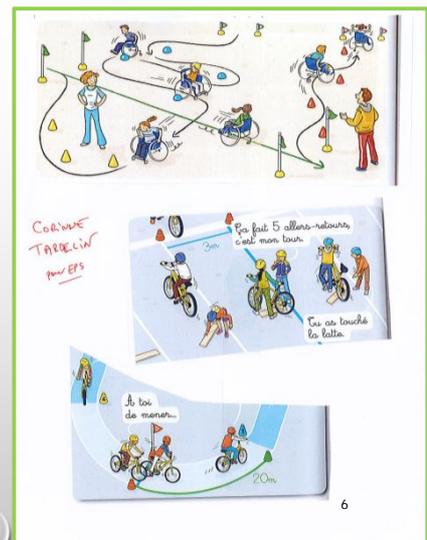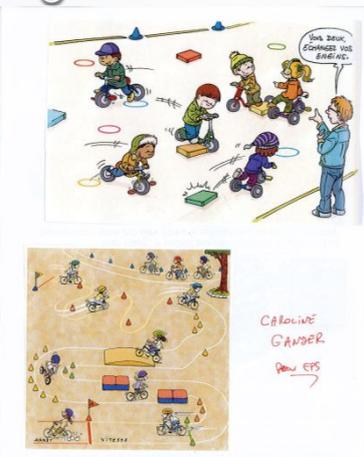
CRITICAL ANALYSIS OF THE PICTORIAL SCALE v0.1

RESULTS

Situation 1	The child lies down in prone position = crocodile (...
Not able	The child stand up in the wading pool (abou... ...m) but does not dare to lie down
In progress	The child is on all fours, not complet... ...t in the water, unsure face.
Able	The child lies down in pron... ...ands in contact with the bottom of the wading pool, with body extended and happy... ...e water

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 75% very relevant
- 25% quite relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?

It is not clear that the child is in contact with the ground

Rate the picture ?

100% Very good   100% Very good   75% Very good
                                    25% Good

8

4
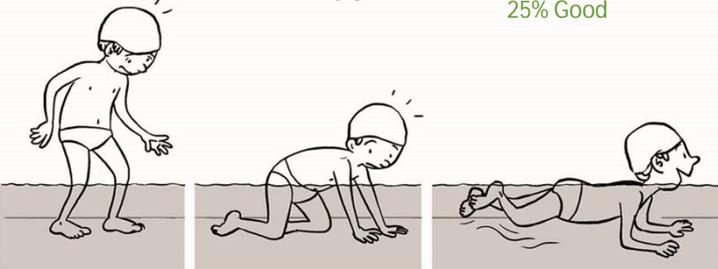
RESULTS

Situation 2	The child accepts immersion until shoulders (WA)
Not able	The child accepts immersion until knees
In progress	The child accepts immersion until bel... ...re face
Able	TThe child accepts immersio... ...s, happy face

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 75% very relevant
- 25% quite relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
"Maybe it would be more evident to understand if the level of the water stay the same and the depth of the pool increase from L1 to L3" (BJ)

Rate the picture ?

100% Very good   100% Very good   100% Very good

9

RESULTS

Situation 3	The child submerges face in the water and blows b...
Not able	The child just dares to put his chin into the wa... ...outh. He is able to blow a floating ball => child standing up. The picture should re... ...w with small waves on the water surface. Represent a floating ball on the water surf... ...orward-sideward for balance.
In progress	The child puts his mouth i... ...a blows bubbles but does not dare to put the nose or the eyes in the water. Child st... ...ms forward-sideward for balance, unsure face
Able	The child submerges t... ...hole face in the water and blows bubbles, relaxed face.

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 100% very relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L1 : "child could blow a little bit more above water -> that way the difference between next situation could be more clear" (AS)

Rate the picture ?

75% Very good   100% Very good   100% Very good
25% Good

10
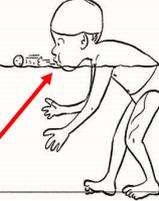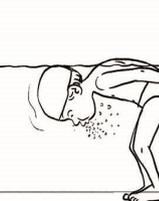
RESULTS

Situation 4	The child catches an object in the shallow water (W...
Not able	The child try to get the object. One hand in t... ...he object but face outside the water. Face feeling not comfortable. Feet on the g...
In progress	The child catches an object in ...er. Feet are kept in contact with the floor. Children don't feel comfortable, (unsu... ...ter
Able	The child catches an ...he shallow water. Feet lose contact with the floor and eyes are opened. Child feels comfortab... (Water level is about at the belly bottom level.)

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
• 100% very relevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
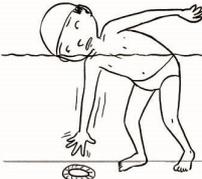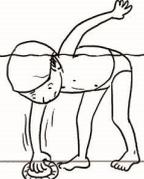
Rate the picture ?
100% Very good   100% Very good   100% Very good

11
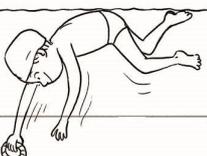
RESULTS

Situation 5	The child is doing a back star (BB)
Not able	The child fails to do the back star. The child i... ...e water with the head back but feet don't leave the bottom of the pool
In progress	The child is doing a back star... ...t a teacher. Ears are submerged, unsure face. Body is well aligned. The teacher pu... ...e back and the second hand is ready to help.
Able	The child is doing a back... ...without any help, relaxed face

✓ L2 improvement

Q1 : How relevant do you rate this situation ?
• 100% very relevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
L2 : *"It would rarely be this within a class situation"(KD)*
"The picture is not perfectly illustrating the situation" (BJ)

Rate the picture ?
50% Very good
100% Very good   50% good   100% Very good

12

RESULTS

Situation 6	The child is doing a front star (BB)
Not able	The child fails to do the front star. The child ...ter looking at the pool but feet do not leave the bottom of the pool
In progress	The child is doing a front star ... a teacher. Teacher's hand on the stomach of the children, unsure face.
Able	The child is doing a front ... without any help with head fully submerged. Child looks relaxed.

✓ **L2 improvement**

Q1 : How relevant do you rate this situation ?
• 100% very relevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
L2 : *"It would rarely be this within a class situation"(KD)*
"The picture is not perfectly illustrating the situation" (BJ)

Rate the picture ?
50% Very good
100% Very good   50% good   100% Very good

13
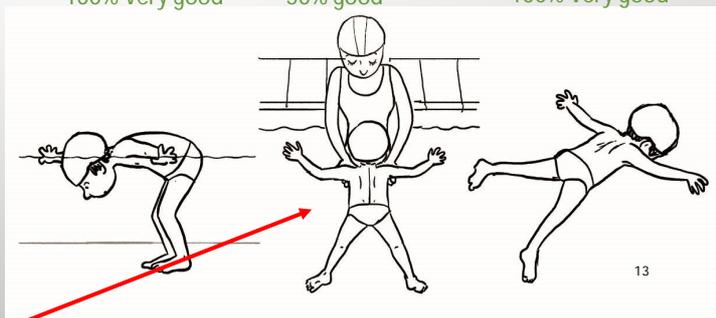
RESULTS

Situation 7	The child enters in the water with a slide (toboggan...
Not able	The child doesn't dare to go on the slide (tob...
In progress	The child enters in the water with a sl... hands out in the direction of the child, unsure face
Able	The child enter in the wate... without any assistance and feels confident.

○ **Shall we keep this situation ?**

Q1 : How relevant do you rate this situation ?
• 75% quite relevant
• 25% very irrelevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
"In Finland this is very rare situation" "(AS)
"In a teaching setting, I wouldn't have this" (KH)
"we slide off the edge of the pool but with no equipment ; so children can start with a seated dive in for instance or a jump standing up " (LB)

Rate the picture ?
67% Very good   33% Very good   67% Very good
33% Good   67% good   33% Good

14
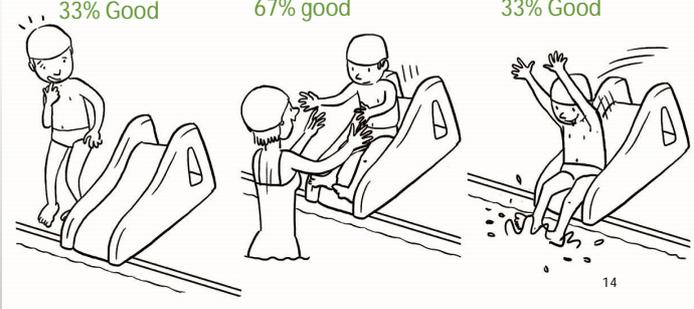
RESULTS

Situation 8	The child is pushing off the wall and gliding (BB,
Not able	The child with one hand gripping the side of the [...] on the ground and one feet on the wall. He doesn't dare to do the exercise., unsure fac[...]
In progress	The child is pushing off the wall wit[...] des with the head out of the water. Segments are not aligned (hips, knees, arms flexed). Th[...] Head is partly in the water with unsure expression.
Able	The child is pushing o[...] glides with the head completely submerged/immerged in the water with arms outstretched in front. Bo[...] aligned.

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 75% very relevant
- 25% quite relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L1: "facial expression should be more "unsure"(AS)
L2 : "some waves on the water surface due to puch"(BJ)
L3 : "Possibly looking more forwards in the final picture rather than straight down "(KH) ;
"position of fingers should be more straight" (AS)
"Hands more extended" (BJ)

Rate the picture ?

75% Very good
25% Good

75% Very good
25% Good

50% Very good - 50% Good

15
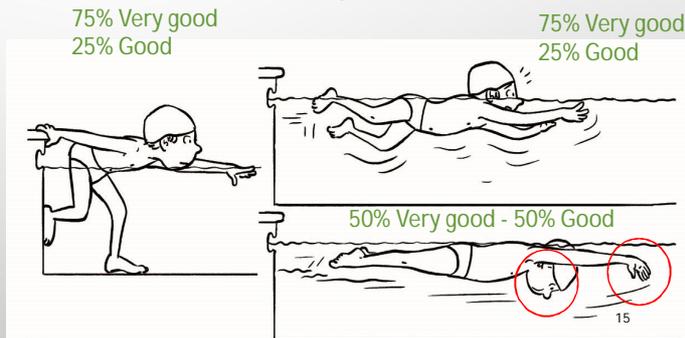
RESULTS

Situation 9	The child is swimming on the back (BB, LP)
Not able	The child try to swim on the back, one hand with [...] er gripping the side of the pool. One foot on the ground. Hip is flexed.
In progress	The child is swimming on the back [...] rd on the stomach and is progressing thanks to a leg kick. Head is aligned with body.
Able	The child is swimming [...] hout a floating board and is progressing (some meters) thanks to a leg kick. Body well aligned, arm [...] he body, relaxed face.

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 100% very relevant
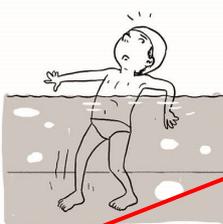
Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L2 : "The body should be a little less extended, with the hip a little ore flexed"(BJ).

Rate the picture ?

100% Very good

75% Very good - 25% good

100% Very good

16
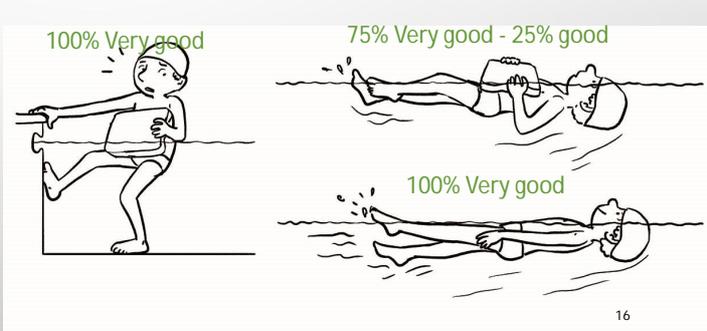
RESULTS

Situation 10	The child is swimming on the front (BB, LP)
Not able	The child try to swim on the front. One hand with [...] him, and the other gripping the side of the pool. One foot on the ground and uncoordinated [...] ents. Head outside the water.
In progress	The child is swimming on the front [...] ard, arms outstretched in front and is progressing thanks to a leg movement.
Able	The child is swimming [...] arms outstretched in front without any floating board and is progressing (some meters) thanks to a leg [...] nt.

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 100% very relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L1 : *"should the child have a little bit more bended legs?" (AS)*
L2 : *"The body should be a little less extended"(BJ).*

Rate the picture ?

75% Very good
25% Good

75% Very good - 25% good

100% Very good

17
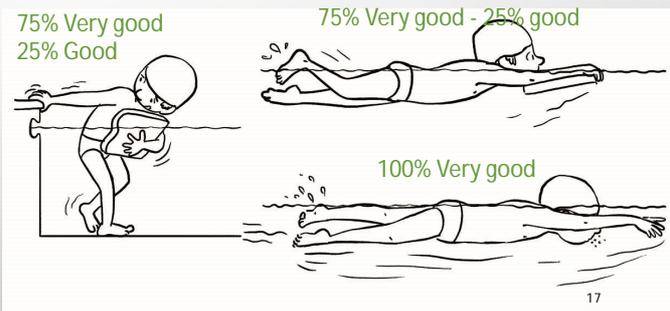
RESULTS

Situation 11	The child is jumping in the undeep water (WE,)
Not able	The child doesn't jump and is scared
In progress	The child is jumping into undeep wa[...] hands out in the direction of the child
Able	The child jumps unassisted i[...] and feels confident.

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 100% very relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L2 : *"I think that teacher's arms should be similar position in this picture than the L1 picture" (AS)*
L2 : *The second picture looks like they will end up as the number 3 picture so it just looks like a stage – I know the teacher is missing in the third picture but don't think this is obvious enough. Maybe the second picture should have the arms of the teacher almost reaching the child (LB)*

Rate the picture ?

50% Very good
25% good
25% very bad

100% Very good

100% Very good

18

RESULTS

Minor improvements ✓

Situation 12	The child is diving in the deep water (WE, UW)
Not able	The child doesn't dare to dive in the deep w...
In progress	The child jump, trying to dive with th... ...rection of the water. Head and body are not aligned with the hand and no... ...rd water
Able	The child dives in the ... ...n confidence and a jump. The picture represents children in aligned position and gives ... ...on of a good jump

Q1 : How relevant do you rate this situation ?
• 100% very relevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
L2 : "The child should be closer to the water and he should have the hip more flexed"(BJ).
L3: « position of fingers » (AS), « Hands more extended » (BJ)

Rate the picture ?

100% Very good   75% Very good   75% Very good
                   25% Good   25% Good

19

RESULTS

✗ Difficult to understand

Situation 13	The child is longitudinal rotation (T) (sideward rot...
Not able	The child stand up in the wading pool (abou... ...m) but does not dare to lie down
In progress	The child is on all fours, not complet... ...n the water, unsure face.
Able	The child lies down in prone... ...ands in contact with the bottom of the wading pool, with body extended and happy... ...e water

Q1 : How relevant do you rate this situation ?
• 50% very relevant
• 25% quite relevant
• 25% very irrelevant

Q2 : Do you agree with the progression ?
• 100% yes

Q3 : Is each level understandable and relevant ?
• 100% yes

Q4 : Would you change anything ?
L1+L2 : "Difficult to see the difference between 1 and 2 without reading the text (=impossible for children to understand)"(AS)
L1+L2 : "Very difficult situation to illustrate ! In L2, we also need different pictured in order to illustrate the complete rotation" (BJ)
L2 :"Need an arrow" (KH)

Rate the picture ?

50% Very good   50% Very good   100% Very good
25% Good   25% Good
25% Very bad   25% Very bad

? ?

RESULTS

Situation 14	The child can reverse direction while swimming (~~...~~ ...tion) (T, LP)
Not able	The child is not able to reverse direction whi~~...~~
In progress	The child can reverse direction whil~~...~~ a board (from back to front)
Able	The child can reverse direc~~...~~ ing (from back to front)

✗ Difficult to understand

Q1 : How relevant do you rate this situation ?
- 25% very relevant
- 25% quite relevant
- 50% quite irrelevant

Q2 : Do you agree with the progression ?
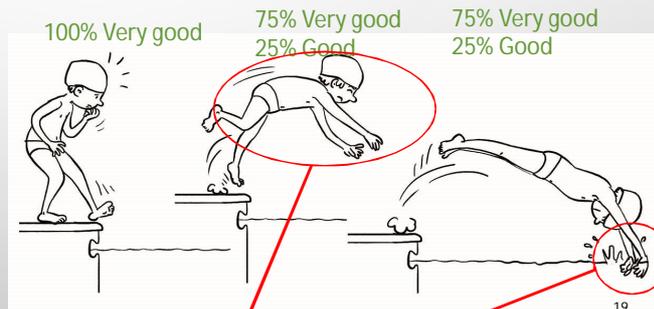- 100% yes

Q3 : Is each level understandable and relevant ?
- 25% yes
- 75% no

Q4 : Would you change anything ?
L1-L3 : "Impossible to know what these pictures try to show" (AS)
L1-L3 : "I don't think these pictures are clear"(LB).
L1-L3 : "each situation need at least 2 or 3 draws to be very understandable" (BJ)

Rate the picture ?

21

RESULTS

Situation 15	The child is treading water (BB, LP)
Not able	The child does not dare to tread (moving u~~...~~ problems to keep head above the water)
In progress	The child treading water with a *fo~~...~~*
Able	The child is treading water ~~...~~ ating device and is able to turn around while looking to the environment

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 75% very relevant
- 25% quite relevant

Q2 : Do you agree with the progression ?
- 100% yes
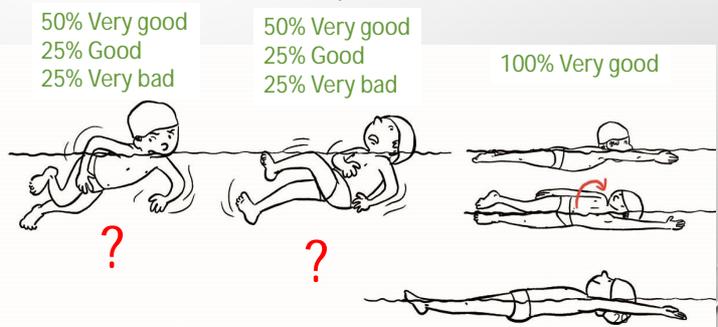
Q3 : Is each level understandable and relevant ?
- 50% yes
- 50% no

Q4 : Would you change anything ?
L2-L3 : "there is a big gap between 2nd and 3rd stage" (LB)
L2-L3 : "L2:the child shouldn't look at the water but in front of him. The arms should strongly hold the 'foam". L3 : Hand more actives or outside the water"BJ).

Rate the picture ?

100% Very good   75% Very good 25% Good   75% Very good 25% good

22

RESULTS

Situation 16	The child is getting out of the water (BE)
Not able	The child is able to get out of the water with~~ ~~ ~~ ~~airs
In progress	The child is climbing out of the shall~~ ~~ ~~ ~~m). Pushes off with feet on the bottom.
Able	The child is getting out of th~~ ~~ ~~ ~~Without push off on the bottom, focus on action of the upper body

✓ Minor improvements

Q1 : How relevant do you rate this situation ?
- 75% very relevant
- 25% quite relevant

Q2 : Do you agree with the progression ?
- 100% yes

Q3 : Is each level understandable and relevant ?
- 100% yes

Q4 : Would you change anything ?
L2 : "L2: perhaps child is already jumped (legs just above the bottom, knees a little bit more bended...otherwise similar position)"(AS)
L2 : Picture with the two little draws showing the pusch on the ground
L3 : Pictures with two draws showing also the initial situation where the children cannot push on the ground (BJ).

Rate the picture ?

100% Very good   50% Very good   75% Very good
                   50% Good   25% good
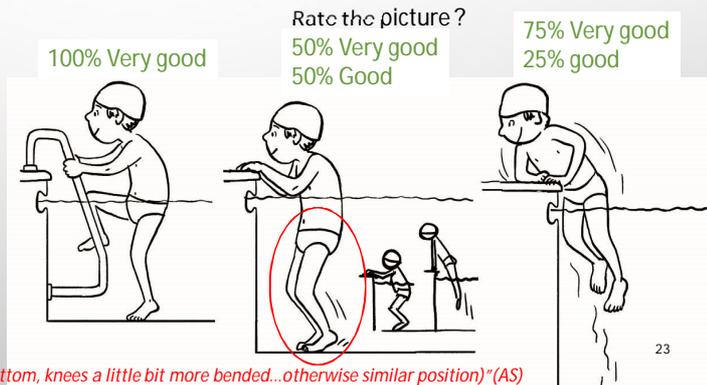
23

RESULTS : OTHER RELEVANT SITUATIONS ?

- AS : "*Diving under water (thru "the wheel" -> length of diving)If possible, perhaps also 10- years- old could be able to swim with appropriate swimming technics like in "freestyle" … that might be interesting to know, but it is not relevant for younger ones. That's why I'm only suggesting one more diving situation* "

- LB : "*as per above, and if so, might include paddling on a board, also I don't remember seeing a picture of someone actually dog paddling a distance? Or swimming a distance? Otherwise this scale is all too easy. My son would have mastered everything by 3 or 4 years old –except a good dive. So it is not really suitable for 4-10. We need to add other competencies. Or this scale is only suitable for preschool children and absolute non swimmers.*"

- BJ : "*Mayby a situation about Diving into the deep water*".

24

RESULTS : PICTURE ABOUT ATTITUDE TOWARD WATER ?

- AS : "*Could it be a picture, where the child is standing beside the pool and s/he has a face 1. expressing dislike 2. neutral and 3. happy, enthuastic face when looking toward the pool and thinking to go there*"

- KD : "*Especially for situations than cause accidents, for example entry water: "look at other people, know depth…" But this can be a second approach next to the motor skills battery : knowledge & attitude*"

- LB : "*Yes – too deep water, rough water, open water, surf, etc .*"

- BJ : "*1 picture about the pleasure or not to go at the swimming pool ; 1 situation about the pleasure or not to take a shower ; 1 situation about the pleasure or not, to to take a bath at the sea*".
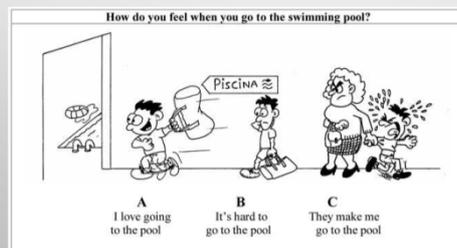
(From Moreno et al, 2008)

25

RESULTS : GLOBAL COMMENT

- AS : "*Some of these situations are not relevant for Finnish method… however, they are interesting to measure*"

- KH : "*Within the UK, specifically within England it is stated within the National Curriculum for children by the age of 11 to be able to swim a length 25m, this is the point at which they leave primary school. For many schools, they take children to an external swimming pool, not many have their own swimming pool due to costs, and each school has to pay for their own swimming. However the Government has recently doubled the amount of money given to schools to help specifically with Physical Education. This means that most children go swimming for a 6 week block, in one particular year in school, and then they may go again if they haven't achieved 25m, as extra sessions. For those who do have a swimming pool on site, these are normally outdoor swimming pool and the school has to wait until it reaches a set temperature (!) before the children are allowed to swim, when they do, they go at least once a week, for all ages 4 - 11.*"

- KD : "*In some situations there can be the need to distinguish 4 levels. Make the water 'colored' blue or gray as in picture 1 and 5, this helps to see the depth view of a swimming pool*"

- LB : "*All pictures refer to a pool. What about the beach? And the river/dam. All very important in Australia especially in relation to drowning. I think we should have some context specific images as well.*"
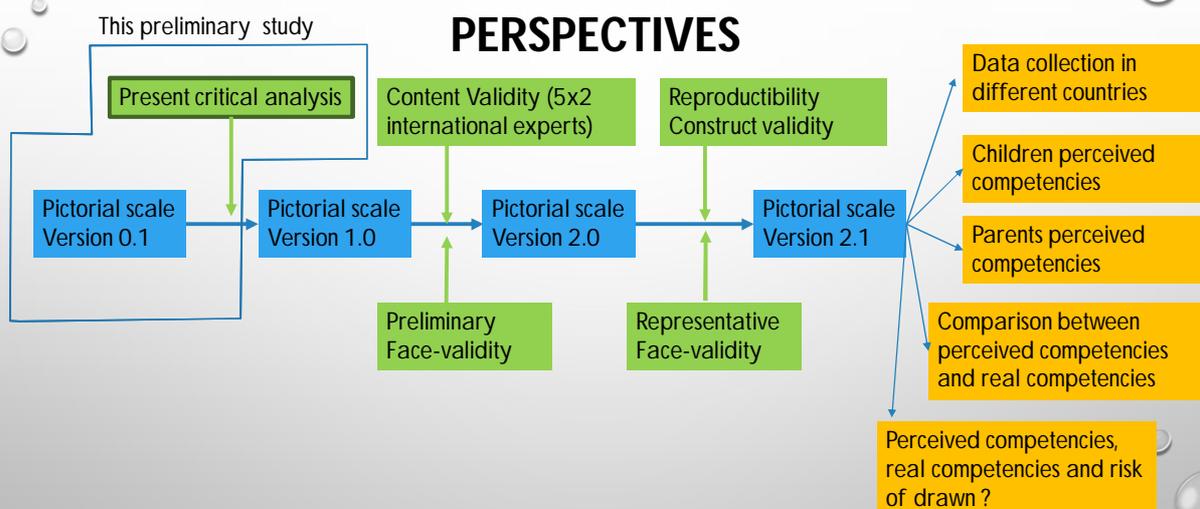
26

CONCLUSION

- 13 OUT OF 16 SITUATIONS ARE RELEVANT AND NEED ONLY MINOR IMPROVEMENTS
- SOLUTIONS HAVE TO BE DISCUSSED FOR THE 3 OTHER SITUATIONS
- ADDITIONAL SITUATIONS (DIVING UNDER WATER ; SWIMMING STYLE) SHOULD BE DISCUSSED
- ATTITUDE TOWARD WATER STILL NEED TO BE DISCUSSED
- RELEVANCE OF THE SITUATIONS MAY NOT BE THE SAME IN ALL COUNTRIES
- PICTORIAL SCALE HAS BEEN BUILD FOR POOL CONTEXT AND NOT FOR OUTDOOR/NATURAL ENVIRONMENT.
- THIS CRITICAL ANALYSIS USEFUL IN THE TOLL DEVELOPMENT PROCESS

27

This preliminary study

PERSPECTIVES

Present critical analysis

Content Validity (5x2 international experts)

Reproductibility Construct validity

Data collection in different countries

Children perceived competencies

Pictorial scale Version 0.1 → Pictorial scale Version 1.0 → Pictorial scale Version 2.0 → Pictorial scale Version 2.1

Parents perceived competencies

Preliminary Face-validity

Representative Face-validity

Comparison between perceived competencies and real competencies

Perceived competencies, real competencies and risk of drawn ?

28

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29

THANK YOU FOR YOUR ATTENTION

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30